

Application No. 10/073,883
Amdt. dated May 20, 2004
Reply to Office Action of January 20, 2004
Docket No. 4512-1002

REMARKS

Applicants submit herewith a certified copy of New Zealand Patent Application 509995, filed February 15, 2001, to perfect applicant's claim to priority.

A replacement drawing is submitted for Figure 1, changing reference numeral 7 on the left-hand side of the drawing figure, to reference numeral 8, to avoid duplicate reference numeral 7, and to indicate the rotating hub, as disclosed at page 3, line 8 of the specification as filed. Since designation of the rotating hub using element 8 is consistent with page 3, line 8 of the specification as filed, the replacement drawing figure does not constitute new matter.

Claims 1-8 were previously pending in the application, with claims 5-8 being withdrawn from consideration as being directed to a non-elected species.

Claims 1-8 are canceled and replaced with new claims 9-28. Claims 9-20 and 25-28 are believed to read on the elected species of Figure 2.

The new claims are believed to address the 35 USC §112, first and second paragraph rejections noted in the Official Action.

Claims 1-4 are rejected as anticipated by RUGGLES 4,487,429.

Reconsideration and withdrawal of the rejection are respectfully requested because the reference does not disclose or suggest a king pin fixed at a predetermined angle to the chassis, as recited in new claim 9. In addition, the reference does not disclose or suggest a steering arm connected to a respective track rod of the steering arm and configured to rotate about a king pin axis upon movement of the respective track rod and constrained so that the steering arm cannot move in the axial direction of the king pin as further recited in new claim 9.

By way of example, page 3, line 26, discloses that king pin 1, is directly attached to the chassis. Page 1, lines 15-16, disclose a king pin fixed relative to the vehicle chassis, and page 1, line 24 also provides a king pin fixed relative to a vehicle chassis.

Figure 2 of the present application shows a steering arm 4 connected to a respective track rod 6 of the steering system and configured to rotate about a king pin axis upon movement of the respective track rod 6 and constrained so that the steering arm cannot move in the axial direction of the king pin. As disclosed on page 3, lines 18-22, there is no vertical movement of the steering arm 4 while it is being rotated. Thus, the common occurrence of the wheels toeing in or out, caused by the steering linkage, with vertical movement of the wheel, is eliminated.

Figure 2 of RUGGLES, for example, shows a vehicle suspension system that is designed to tilt as the vehicle corners. Specifically, RUGGLES discloses a suspension pod 18 pivotally attached at pivots 30 and 32 to yoke 34. A splined shaft 28 (king pin) in the suspension pod 18 has an axial support arm 38 slidably mounted thereon. As shown in Figure 4 of RUGGLES, for example, the suspension arrangement is configured such that as the vehicle wheels are turned, the entire suspension arrangement tilts into the turn. During such movement, the entire suspension pods 18 pivot about the respective pivot points 30, 32, and the splined shaft 28 (king pin) also tilts as the pod 18 pivots. Since the king-pin pivots, the king pins are not fixed at a predetermined angle to the chassis, as recited in new claim 9.

It is necessary for the king pins in RUGGLES to change angle to provide the tilting movement of the wheels into a turn. If the king pins of RUGGLES were fixed at predetermined angles, then RUGGLES would be unsatisfactory for its intended purpose of tilting into a turn.

In addition, the suspension arrangement of RUGGLES does not have steering arms connected to respective track rods of the steering system and configured to rotate about respective king pin axes upon movement of the respective tie rod and constrained so that the steering arm cannot move in the axial direction of the king pin. RUGGLES has a connection between the king pin and

steering arms using beveled gears 54 and 56. RUGGLES does not disclose or suggest that such connection cannot move in the axial direction of the king pin.

By way of further explanation, the suspension system as claimed in claim 9 of the present application is significantly less complex and thus less expensive to manufacture than RUGGLES. By virtue of the fixed mounting of the king pin at predetermined angles to the chassis and the lack of movement of the steering arm in the axial direction of the king pins, the track rods of the present application can be of a constant length and will not be subject to any significant vertical arcing, but at the same time the suspension subassemblies will accommodate reciprocal wheel movement in the axial direction of the king pins, without causing toe and bump steer.

In RUGGLES, the steering shafts require pivoting universal joints and sliding joints which are significantly more expensive to manufacture and less reliable and cannot be incorporated into a system having a king pin fixed at a predetermined angle to the chassis, as recited in new claim 9. Accordingly, claim 9 and the claims which depend therefrom, are believed patentable over RUGGLES.

Claims 1-4 are rejected as anticipated by BURROWS 6,047,981.

Reconsideration and withdrawal of the rejection are respectfully requested because the reference does not or suggest a steering system comprising a pair of outwardly extending track rods, and two wheels mounted for rotation on respective suspension subassemblies, as recited in new claim 9 of the present application. In addition, the reference does not disclose or suggest that each suspension subassembly comprises a king pin fixed at a predetermined angle to the chassis and a steering arm connected to a respective track rod of the steering system and configured to rotate about a king pin axis upon movement of the respective track rod and constrained so that the steering arm cannot move in the axial direction of the king pin, as further recited in new claim 9 of the present application.

Initially, applicant would like to point out that BURROWS is directed to a bicycle which has a steering system connected to a single front wheel. There is no suggestion that the arrangement of BURROWS could be used with vehicles having two front wheels which are used to steer the vehicle.

In the bicycle of BURROWS, the front wheel is turned via handle bars and a shaft extending through a head tube. As such, BURROWS does not disclose a track rod such that a steering arm connected to a respective track rod of the steering system is configured to rotate about a king pin upon movement of the respective track rod, as recited in claim 9. Accordingly, BURROWS

could not disclose or suggest a steering system comprising a pair of outwardly extending track rods as further recited in claim 9.

In addition, there is no teaching or suggestion in BURROWS that the suspension arrangement of BURROWS could be modified to support two wheels mounted for rotation on respective suspension subassemblies that would be connected to the single head tube 21.

Further, BURROWS does not appear to teach that for which it is offered. Specifically, the Official Action indicates that element 40 of BURROWS is a third member (steering arm) that rotates about an axis of the king pin. However, as seen in Figure 3 of BURROWS, element 40 is rigidly connected to element 21 and element 31, so that as the handle bars 24 are turned, head tube 21 and upper section 31 move with each other so that there is no rotation about head tube 21 (indicated in the Official Action as a king pin).

Accordingly, BURROWS does not disclose a steering arm configured to rotate about a king pin as recited. In addition, one of ordinary skill in the art would not look to the teachings of a bicycle such as BURROWS to eliminate toe and bump steer, which is prevalent on a two front wheeled vehicle. In any event, BURROWS could not be modified to result in a configuration having steering arms which are constrained so that they cannot move in the axial direction of the king pins and that the steering arm

connected to respective track rod of the steering system configured to rotate about a king pin axes upon movement of the respective track rod as recited in claim 9. Accordingly, claim 9 and the claims which depend therefrom, are believed patentable over BURROWS.

New claim 9 is believed generic to the embodiments of both Figure 1 and Figure 2. Accordingly, since claim 9 is believed generic and believed patentable over the cited prior art, withdrawn of the restriction requirement is respectfully requested and examination of claims 21-24 which are believed directed to the unelected embodiment of Figure 1, are respectfully requested.

In view of the present amendment and the foregoing remarks, it is believed that the present application has been placed in condition for allowance. Reconsideration and withdrawal of the rejection are respectfully requested.

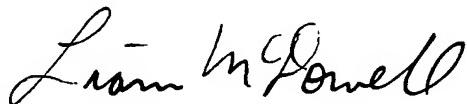
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overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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